IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Lavian	
Application No.: 09/747296	Group Art Unit: 2419
Filed: 12/22/2000	Examiner: Lee
Title: Dynamic Assignment of Traffic Classes to a Priority Queue in a Packet Forwarding Device	Confirmation No. 2616
Attorney Docket No.: 120-081	

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REPLY BRIEF

Sir:

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I. Real Party in Interest

The real party in interest is Nortel Networks Limited.

II. Related Appeals and Interferences

Appellants are not aware of any related appeals or interferences.

III. Status of the Claims

Claims 1 and 3-24 are pending in this application. All of the pending claims are rejected. Claim 2 is cancelled. Claims 1, 3-5, 7-9, 13, and 20 are previously presented. Claims 6, 10-12, 14-19, and 21-24 are original. The rejections of claims 1, 13, and 20 are the subject of this appeal.

IV. Status of Amendments

All submitted amendments have been entered and considered.

V. Summary of Claimed Subject Matter

As described in the specification at page 2, variable queueing delays tend to degrade data streams associated with real-time sampling. Further, data from one source may be impeded by data from a relatively less important source. The presently claimed invention helps to mitigate these problems by dynamically modifying packet priority. When the type of packet traffic is unicast type, priority of the traffic is selectively modified in response to a destination parameter of the packet traffic such as egress port, destination MAC address or destination IP

address. When the type of packet traffic is multicast type, the priority of the traffic is selectively modified in response to a source parameter of the packet traffic such as ingress port, source MAC address or source IP address.

The limitations recited in the independent claims are supported by the specification as indicated below in bold.

1. (previously presented) In a packet forwarding device, a method comprising:

monitoring types of packet traffic received in the packet forwarding device; **Forwarding information 110 is received from the processing unit at block 115. At block 117, the ARU stores the forwarding information in an AR table entry. At decision block 119, the physical egress port identifier stored in the AR table entry is compared against priority configuration information to determine if packets destined for the egress port have been selected for priority egress queueing. Page 11, lines 1-5. See also page 11, lines 6-23.**

determining whether a type of packet traffic received in the packet forwarding device is a unicast type or a multicast type; and **The ingress port, source MAC address or source VLAN of a packet may also be used to determine whether to queue the packet in the priority egress queue. Page 12, lines 1-3.**

when the type of packet traffic is unicast type, selectively modifying a priority of the traffic in response to a destination parameter of the packet traffic; and **Priority or best effort queueing of unicast traffic is determined based on**

destination parameters, e.g., egress port, destination MAC address or destination IP address, while priority or best effort queueing of multicast traffic is determined based on source parameters, e.g., ingress port, source MAC address or source IP address. Page 12, lines 3-7.

when the type of packet traffic is multicast type, selectively modifying the priority of the traffic in response to a source parameter of the packet traffic **Id.**

wherein the step of selectively modifying the priority includes performing at least one of changing assignment of the packet traffic from a queue having a first priority to a queue having a second priority, dropping packets of the packet traffic, copying packets of the packet traffic, and diverting packets of the predetermined type in the packet traffic. **Dynamic filtering decisions may be made on how to process packets other than choosing whether they should go to a priority or best effort queue. For example, they may be dropped or copied, or traffic of a specific type as described above may be diverted. Page 21, lines 19-22.**

13. (previously presented) In a packet forwarding device, a method comprising:

monitoring environmental conditions of reception of packet traffic in the packet forwarding device; **Forwarding information 110 is received from the processing unit at block 115. At block 117, the ARU stores the forwarding information in an AR table entry. At decision block 119, the physical egress port identifier stored in the AR table entry is compared against priority configuration information to determine if packets destined for the egress port**

have been selected for priority egress queueing. Page 11, lines 1-5. See also page 11, lines 6-23.

determining whether environmental conditions of reception of packet traffic in the packet forwarding device meet predetermined criteria, modifying a priority of the packet traffic using parameter information associated with a type of packet traffic, wherein the type of packet traffic includes unicast and multicast traffic, and wherein source parameter information is used for multicast traffic and destination parameter information is used for unicast traffic, and wherein the step of modifying includes automatically performing at least one of changing assignment of packet traffic from a queue having a first priority to a queue having a second priority, dropping packets in the packet traffic, copying packets in the packet traffic, and diverting packets in the packet traffic. **The ingress port, source MAC address or source VLAN of a packet may also be used to determine whether to queue the packet in the priority egress queue. Page 12, lines 1-3. Priority or best effort queueing of unicast traffic is determined based on destination parameters, e.g., egress port, destination MAC address or destination IP address, while priority or best effort queueing of multicast traffic is determined based on source parameters, e.g., ingress port, source MAC address or source IP address. Page 12, lines 3-7. Dynamic filtering decisions may be made on how to process packets other than choosing whether they should go to a priority or best effort queue. For example, they may be dropped or copied, or traffic of a specific type as described above may be diverted. Page 21, lines 19-22.**

20. (previously presented) In a packet forwarding device, a method comprising:

monitoring traffic patterns of packet traffic received in the packet forwarding device; **Forwarding information 110 is received from the processing unit at block 115. At block 117, the ARU stores the forwarding information in an AR table entry. At decision block 119, the physical egress port identifier stored in the AR table entry is compared against priority configuration information to determine if packets destined for the egress port have been selected for priority egress queueing. Page 11, lines 1-5. See also page 11, lines 6-23.**

determining whether traffic patterns of packet traffic in the packet forwarding device meet predetermined criteria; and **The ingress port, source MAC address or source VLAN of a packet may also be used to determine whether to queue the packet in the priority egress queue. Page 12, lines 1-3.**

when the traffic patterns of packet traffic meet the predetermined criteria, selectively modifying a priority of the packet traffic using parameter information associated with a type of packet traffic, wherein source parameter information is associated with multicast type packet traffic and destination parameter information is associated with unicast type packet traffic, **Priority or best effort queueing of unicast traffic is determined based on destination parameters, e.g., egress port, destination MAC address or destination IP address, while priority or best effort queueing of multicast traffic is determined based on source parameters, e.g., ingress port, source MAC address or source IP address. Page 12, lines 3-7.**

and wherein the step of selectively modifying includes automatically performing at least one of changing assignment of at least one type of packet traffic from a queue having a first priority to a queue having a second priority, dropping packets in the packet traffic, copying packets in the packet traffic, and diverting packets in the packet traffic. **Dynamic filtering decisions may be made on how to process packets other than choosing whether they should go to a priority or best effort queue. For example, they may be dropped or copied, or traffic of a specific type as described above may be diverted. Page 21, lines 19-22.**

VI. Grounds of Rejection to be Reviewed on Appeal

A. Claims 1, 3-10, 12-15, 17, and 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,094,435 (Hoffman) in view of US 7,009,968 (Ambe).

B. Claims 11, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman in view of Ambe and further in view of US 6,611,867 (Bowman-Amuah).

VII. Argument

A. The cited combination fails to teach or suggest dynamic modification of priority level in response to a parameter of the packet traffic as recited in claims 1, 3-10, 12-15, 17, and 19-24.

Three basic criteria must be met in order to establish a *prima facie* case of obviousness. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the prior art references must teach or suggest all the claim limitations. (MPEP §2143) As will be explained below, the cited combination of references at least fails to teach or suggest all of the claim limitations.

The examiner concedes that Hoffman fails to disclose selectively modifying the priority of the traffic in response to a destination parameter of the packet traffic when the type of packet traffic is unicast, and selectively modifying the priority of the traffic in response to a source parameter of the packet traffic when the type of packet traffic is multicast, but cites Ambe at column 3:29-51; column 9:13-36; column 13:16-31 and figure 8 as describing these features. Ambe, like Hoffman and other cited references, show that packet prioritization and unicast and multicast packet types were well known in the prior art. However, the examiner fails to adequately explain the reasons for rejecting the limitations associated with modifying packet priority in response to a source or destination parameters based on whether the packet is unicast or multicast. The cited passages and figure appear to include only one reference to changing packet priority: "some of the actions may involve changing the 802.1p priority in the packet Tag header."[1] Appellant submits that the cited statement fails to support a rejection of a claim that recites

[1] Ambe at column 9:19:20

modifying priority *based on whether the packet is unicast or multicast*. Further, the recited limitation is even more specific because it recites modifying the priority in response to a *destination parameter* in the case of unicast traffic and in response to a *source parameter* in the case of multicast traffic. The examiner does not explain in what way the description of the address resolution logic at column 13 and the illustration of the "E_Dst search flowchart" of figure 8 are allegedly relevant to the recited limitations. Packet prioritization and unicast/multicast types are well known, but none of the references cited in this prosecution show the recited relationship between those things. Appellant respectfully suggests that the examiner improperly attempts to interrelate those features without support from the references and with the benefit of improper hindsight.[2]

The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 USPQ2d 1385, 1396 (2007) noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. The Federal Circuit has stated that "rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006). If the

[2] The requirement "at the time the invention was made" is to avoid impermissible hindsight. MPEP 2141.01 (III). "It is difficult but necessary that the decisionmaker forget what he or she has been taught . . . about the claimed invention and cast the mind back to the time the invention was made (often as here many years), to occupy the mind of one skilled in the art." *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984)

examiner determines there is factual support for rejecting the claimed invention under 35 U.S.C. 103, the examiner must then consider any evidence supporting the patentability of the claimed invention, such as any evidence in the specification or any other evidence submitted by the applicant. The ultimate determination of patentability is based on the entire record, by a preponderance of evidence, with due consideration to the persuasiveness of any arguments and any secondary evidence. *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). If it is the examiner's considered opinion that the asserted advantages are not sufficient to overcome the rejection of record, the examiner should state the reasons for that position in the record, preferably in the action following the assertion or argument relative to such advantages so that the applicant will know that the asserted advantages have actually been considered by the examiner and, if appeal is taken, the Board of Patent Appeals and Interferences will also be advised. MPEP 707.07(f). For the reasons stated above, the examiner has not satisfied these requirements.

The distinguishing limitations discussed above are recited in the independent claims as follows. Claim 1 recites "when the type of packet traffic is unicast type, selectively modifying a priority of the traffic in response to a destination parameter of the packet traffic; and when the type of packet traffic is multicast type, selectively modifying the priority of the traffic in response to a source parameter of the packet traffic." (emphasis added) Claim 13 recites "modifying a priority of the packet traffic using parameter information associated with a type of packet traffic, wherein the type of

packet traffic includes unicast and multicast traffic, and wherein source parameter information is used for multicast traffic and destination parameter information is used for unicast traffic." (emphasis added) Claim 20 recites "selectively modifying a priority of the packet traffic using parameter information associated with a type of packet traffic, wherein source parameter information is associated with multicast type packet traffic and destination parameter information is associated with unicast type packet traffic." (emphasis added) The dependent claims further distinguish the invention and are allowable for the same reasons as their respective base claims.

The examiner argues in the RESPONSE TO ARGUMENTS[3] that Hoffman discloses selectively modifying priority of the traffic in response to a destination parameter of the packet traffic when the type of packet traffic is unicast type by stating "whether any priority should be associated with the packet … the number of output ports that the packet will output, the priority of the packet." The examiner also argues that Hoffman discloses selectively modifying the priority of the traffic in response to a source parameter of the packet traffic when the type of packet traffic is multicast type by stating "the entry may indicate whether the packet is part of a multicast routing" and "whether any priority should be associated with the packet." Appellant cannot find the quoted statements in the cited passages and does not see how they can be interpreted as suggesting anything more than that priority would be changed for both unicast and multicast packets. Hoffman provides a succinct description in the abstract by stating that:

[3] Response to Arguments at pages 14-15 of the final OA dated March 23, 2010

> When output queues exceed or meet a threshold value below the queue's capacity packets are randomly discarded. When the queue becomes full, the network element determines which flow caused the queue to overflow. The priority of that flow is lowered. In a multicast packet, the packet may have different priorities at each output port. Scheduling of multiple output queues at each output port uses a weight round robin approach that allocates a weight portion of packets to transmit at each time interval.

Note that lowering the priority of the flow that causes a queue to overflow makes no distinction between unicast and multicast packets, nor any distinction between modifying priority of the traffic in response to a destination parameter for a unicast packet and in response to a source parameter for a multicast packet. Further, the suggestion of a multicast packet having different priorities at each output port suggests that priority for multicast packets is based on some factor associated with the destination rather than a source parameter as recited in the claims. Again, packet prioritization and unicast/multicast types are well known, but the examiner has failed to establish that the recited relationship between those features is taught or suggested by the cited references. More particularly, the examiner improperly attempts to interrelate those features without support from the references and with the benefit of hindsight.

In the EXAMINER'S ANSWER the examiner counters that:

> Hoffman et al. teach "when the type of packet traffic is unicast type" as "in a unicast route, the incoming packet would have had its destination address"; see Hoffman et al col. 17, lines 5 - 9, examiner interpreted "selectively modifying a priority queue associated with the traffic in response to a destination

> parameter of the packet traffic" as "whether any priority should be associated with the packet", "the number of output ports that the packet will be output, the priority of the packet, ... "; see Hoffman et al., col. 15, lines 57 - 65, col. 17, lines 5 - 9, col. 18, lines 11 - 24; further, in col. 7, lines 60 - 67, col. 8, lines 1 - 3, show the modification to the unicast packet, after be determined what actions are necessary on the packet.

The examiner also states that:

> Reciting the limitations using reference Ambe et al., Examiner further interpreted "selectively modifying priority in response to the destination parameter of the packet traffic when the type of packet traffic is unicast type, and selectively modifying the priority in response to a source parameter of the packet traffic when the type of packet traffic is multicast type" as "information including source address and destination address, determine whether the incoming data packet is a unicast packet, a multicast packet, depending on the outcome different actions are taken" ....change the 802.1 priority ", see Ambe et al., col. 9, lines 13 - 23, lines 26 - 36, col. 13, lines 16 - 31, Fig. 8, Fig. 18. Figure 8 is recited and referred to, for the figure is directed to source and Destination search for unicast and multicast and priority being modified, see col. 16, lines 53 - 67, col. 17, lines 1 - 3, 42 - 55.

The examiner's statements are confusing because different references are cited as teaching the same claim feature. Nevertheless, the examiner again merely cites unrelated instances of terms such as "unicast" and "priority" which are combined in a manner that contradicts what is actually taught by the references. Contrary to the examiner's assertion, Hoffman does not suggest any relationship between deciding "whether any priority should be associated with the packet" and "in a unicast route, the incoming packet would have had its destination address [as the multilayer network element]." Moreover, Hoffman specifically teaches that the priority of a flow is lowered when that

flow causes a queue to overflow, without regard for whether a packet is unicast or multicast. Ambe merely states that "some of the actions may involve changing the 802.1p priority in the packet Tag header."[4] The references mention source addresses, destination addresses, unicast, multicast and priority, but not the relationships recited in the claims. The examiner cannot reasonably conclude that it is obvious to selectively modifying priority of the traffic in response to a destination parameter of the packet traffic when the type of packet traffic is unicast type, and selectively modifying the priority of the traffic in response to a source parameter of the packet traffic when the type of packet traffic is multicast type, simply because addresses, unicast packets, multicast packets, queues and packet priority are known. Nevertheless, that is what is asserted in the Examiner's Answer.

In the EXAMINER'S ANSWER the examiner also states with regard to the use of hindsight that "it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning … but so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper."[5] With respect, the statement fails to counter appellant's argument. Appellant argues that the examiner fails to adequately explain the reasons for rejecting the limitations associated with modifying packet priority in response to a source or destination parameters based on

[4] Ambe at column 9:19:20
[5] citing In re McLaughlin, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971)

whether the packet is unicast or multicast. For example, the examiner does not explain in what way the description of the address resolution logic at column 13 and the illustration of the "E_Dst search flowchart" of figure 8 are allegedly relevant to the recited limitations. Packet prioritization and unicast/multicast types are well known, but none of the references cited in this prosecution show the recited relationships between those things. The examiner improperly uses hindsight to interrelate known features in the previously unknown manner recited in the claims because the examiner fails to provide an explanation for why the unrelated features from the references ought to be combined in the claimed manner and because the motivation for combining those features in the claimed manner is clearly coming from this application.[6]

B. Claims 11, 16 and 18 further distinguish the invention and are allowable for the same reasons as their respective base claims.

If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Claims 11, 16 and 18 are therefore allowable for the reasons stated above with regard to their respective base claims.

[6] The requirement "at the time the invention was made" is to avoid impermissible hindsight. MPEP 2141.01 (III). "It is difficult but necessary that the decisionmaker forget what he or she has been taught . . . about the claimed invention and cast the mind back to the time the invention was made (often as here many years), to occupy the mind of one skilled in the art." *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984)

Conclusion

The rejections are improper for at least the reasons set forth above. Appellants accordingly request that the rejections be reversed and the application put forward for allowance.

Respectfully submitted,

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Appendix A - Claims

1. (previously presented) In a packet forwarding device, a method comprising:

monitoring types of packet traffic received in the packet forwarding device;

determining whether a type of packet traffic received in the packet forwarding device is a unicast type or a multicast type; and

when the type of packet traffic is unicast type, selectively modifying a priority of the traffic in response to a destination parameter of the packet traffic; and

when the type of packet traffic is multicast type, selectively modifying the priority of the traffic in response to a source parameter of the packet traffic

wherein the step of selectively modifying the priority includes performing at least one of changing assignment of the packet traffic from a queue having a first priority to a queue having a second priority, dropping packets of the packet traffic, copying packets of the packet traffic, and diverting packets of the predetermined type in the packet traffic.

2. (cancelled)

3. (previously presented) The method of claim 1, wherein the source parameter includes a source MAC address.

4. (previously presented) The method of claim 1, wherein the source parameters includes a source VLAN.

5. (previously presented) The method of claim 1, wherein the type of packet traffic is associated with its ingress port.

6. (original) The method of claim 1, wherein the type of packet traffic is based on its destination.

7. (previously presented) The method of claim 6, wherein the destination parameter includes a destination MAC address.

8. (previously presented) The method of claim 6, wherein the destination parameter includes a destination VLAN.

9. (previously presented) The method of claim 1, wherein the type of packet traffic is associated with its egress port.

10. (original) The method of claim 1, wherein the type of traffic is based on its protocol.

11. (original) The method of claim 10, wherein the protocol of traffic includes FTP.

12. (original) The method of claim 10, wherein the protocol of traffic includes HTTP.

13. (previously presented) In a packet forwarding device, a method comprising: monitoring environmental conditions of reception of packet traffic in the packet

forwarding device; determining whether environmental conditions of reception of packet traffic in the packet forwarding device meet predetermined criteria, modifying a priority of the packet traffic using parameter information associated with a type of packet traffic, wherein the type of packet traffic includes unicast and multicast traffic, and wherein source parameter information is used for multicast traffic and destination parameter information is used for unicast traffic, and wherein the step of modifying includes automatically performing at least one of changing assignment of packet traffic from a queue having a first priority to a queue having a second priority, dropping packets in the packet traffic, copying packets in the packet traffic, and diverting packets in the packet traffic.

14. (original) The method of claim 13, wherein the environmental conditions meeting the predetermined criteria include time of day.

15. (original) The method of claim 13, wherein the environmental conditions meeting the predetermined criteria include network configuration changes.

16. (original) The method of claim 15, wherein the network configuration changes include network failures.

17. (original) The method of claim 15, wherein the network configuration changes include network congestion.

18. (original) The method of claim 13, wherein the environmental conditions meeting the predetermined criteria include network error rates.

19. (original) The method of claim 13, wherein the environmental conditions meeting the predetermined criteria include line use of high level protocols.

20. (previously presented) In a packet forwarding device, a method comprising:
monitoring traffic patterns of packet traffic received in the packet forwarding device;
determining whether traffic patterns of packet traffic in the packet forwarding device meet predetermined criteria; and
when the traffic patterns of packet traffic meet the predetermined criteria, selectively modifying a priority of the packet traffic using parameter information associated with a type of packet traffic, wherein source parameter information is associated with multicast type packet traffic and destination parameter information is associated with unicast type packet traffic, and wherein the step of selectively modifying includes automatically performing at least one of changing assignment of at least one type of packet traffic from a queue having a first priority to a queue having a second priority, dropping packets in the packet traffic, copying packets in the packet traffic, and diverting packets in the packet traffic.

21. (original) The method of claim 20, wherein at least some of the traffic patterns are based on specified source ports.

22. (original) The method of claim 20, wherein at least some of the traffic patterns are based on specified destination ports.

23. (original) The method of claim 20, wherein at least some of the traffic patterns are based on specified source MAC addresses.

24. (original) The method of claim 20, wherein at least some of the traffic patterns are based on specified IP flows.

Appendix B - Evidence Submitted

None.

Appendix C - Related Proceedings

None.